INFLUENCE OF FFA ACTIVITIES ON CRITICAL THINKING SKILLS IN TEXAS THREE-STAR CHAPTERS

A Thesis

by

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Submitted to the Office of Graduate and Professional Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

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December 2013

Major Subject: Agricultural Leadership, Education, and Communication

ABSTRACT

The purpose of this study was to determine the effect of FFA activities on critical thinking skills of Texas FFA members in three-star FFA chapters. This descriptive study was conducted in eight purposively selected three-star agricultural education programs throughout Texas. Seniors within each agricultural education program were selected to complete a demographic survey and the Watson-Glaser Critical Thinking Appraisal (WGCTA). A response rate of 43% was achieved, with 65 students completing the demographics survey and the WGCTA.

The mean score for all FFA members who completed the survey was 39.85, which is considerably lower than the WGCTA norm group at 48.5 (Watson & Glaser, 1980). With a mean score of 39.85, the FFA members who completed the WGCTA scored in the 25th percentile of high school students in the 12th grade (Watson & Glaser, 1980). The FFA members performed best on the Evaluation of Arguments subtest with a mean on 9.02 and scored lowest on the Inference subtest with a mean of 5.35. The results show FFA members were most involved in receiving a FFA degree and were least involved in speaking events. The only FFA activity that is an indicator of FFA members' critical thinking ability is the State LDE contest. Gender is an indicator of FFA members' critical thinking ability. Additionally, the results show a moderate correlation between gender and scores on the WGCTA and a low correlation between FFA members' years of experience and scores on the WGCTA.

ACKNOWLEDGEMENTS

It is unbelievable this part of my education is coming to an end. I am grateful to have had the opportunity to get my masters in the Agricultural Leadership, Education, and Communications department at Texas A&M University. I have learned so many things to better myself in my professional career, and I am appreciative of every person who has helped me along the way.

I would like start by thanking my committee chair, Dr. Rayfield, and my committee members, Dr. Moore and Dr. Skaggs, for their guidance and support throughout the course of this research. Dr. Rayfield, you have helped my tremendously through my undergraduate and graduate student education by providing me with the knowledge and advice to hopefully become a great agricultural science teacher.

I would also like to thank my officemates, Will, Marcus, and Erynne, not only did you make my time as a graduate student unforgettable, you were always there for a shoulder to lean on when thing got tough, and I will be forever grateful for your friendships. I have no doubt that we will all be successful educators and our friendship will continue to grow.

I also want to extend my gratitude to the Pearson Education Inc., which provided the critical thinking assessment, and to all the agricultural science teachers and students who were willing to participate in the study. Additionally, I owe a special thanks to Dr. McKim and Damian Dominguez for helping me scan all of my instruments and code all of my data.

My family is the rock that has anchored my strength to pursue a graduate degree. Thank you to my mother and father, Ken and Liz Belsher, for their encouragement and their unfailing faith in me. I could not ask for better parents and I would not be the person I am today without you. Also, thank you to my sister, Amy Belsher. Whether you are being a protective big sister or my biggest supporter, I will always be grateful to have you as my sister. Finally, I want to thank my husband, Rocky Latham, for always encouraging me to set my goals high and providing the strength for me day in and day out to accomplish them. Rocky, you are truly an inspiration for me and I would not have been able to do this without you.

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CHAPTER I
INTRODUCTION

Background and Setting

Before 1917, teaching agriculture was not federally regulated in the public school system. The passing of the Smith-Hughes Act of 1917 allowed for the creation of the Federal Board for Vocational Education, which was responsible for establishing and regulating vocational education. States were required to offer teacher training and submit program plans to The Federal Board of Vocational Education. Through the Smith-Hughes Act of 1917, The Federal Board for Vocational Education's purpose was to promote training in agriculture, trades and industries, commerce, and home economics in secondary schools (Tenney, 1977). Therefore, the foundation of agricultural education is accredited to this piece of legislation. As time and interest in agricultural education progressed, the Federal Board for Vocational Education was asked to assist in the development of an agricultural youth organization and governance the organizations structure and by-laws (Talbert, Vaughn, Croom, & Lee, 2007). As a result, "on November 20, 1282, 33 delegates from 18 states officially adopted the constitution and bylaws of the new organization" (Talbert et al., 2007, p. 445).

Agricultural education is comprised of three integral components to establish a complete program: Classroom/laboratory instruction, FFA, and Supervised Agricultural Experiences (SAE). This study will focus primarily on the FFA component of an agricultural education program. According to Texas FFA (2012) the FFA motto states, "FFA makes a positive difference in the lives of students by developing their potential

for premiere leadership, personal growth, and career success through agricultural education." Chartered in 1929, Texas FFA provides members with numerous opportunities to enhance leadership and career skills through various FFA activities (Texas FFA, 2012).

John Dewey, a famous pragmatist, "…believed the importance and value of vocational education stemmed from the ability of the individual to 'learn by doing'" (Talbert et al., 2007, p. 53). FFA activities promote Dewey's belief by applying knowledge gained in the classroom/laboratory through real-life scenarios. Texas FFA (2012) stated "Career Development Events (CDEs) are designed to help a member prepare for a career in agriculture by testing and challenging the student's technical, leadership, interpersonal and teamwork skills as well as their knowledge of the subject matter" (p. 25).

In the early 1900s, vocational education provided students with the skills and knowledge through a form of instructional program or apprenticeship (Talbert et al., 2007). To modernize vocational education, the Committee of Agricultural Education in Secondary Schools (National Research Council, 1988) concluded that redirecting agricultural education programs was needed if graduates of those programs were going to be successful in college or the workforce. The committee suggested an improvement to include more opportunities to enhance critical thinking skills for students in agricultural education (National Research Council, 1988). To satisfy this suggestion, during the 1980s, agricultural education made improvements to strive to develop students' higher-order thinking skills (Talbert et al., 2007). The shift in the philosophy of

agricultural education was implemented to encourage students to "think independently, analyze data, and synthesize new methods, products, and processes" in a changing workplace environment (Talbert et al., 2007, p. 60).

Many critical thinking theorists derived their philosophies from John Dewey. Dewey (1933) believed there were three attitudes mandatory for critical thinking to occur: open mindedness, responsibility, and wholeheartedness. There have been many critical thinking definitions developed over the years. Pascarella and Terenzini (1991) have nicely combined several definitions and stated that critical thinking

> …typically involves the individual's ability to do some or all of the following: identify central issues and assumptions in an argument, recognize important relationships, make correct inferences from data, deduce conclusions from information or data provided, interpret whether conclusions are warranted on the basis of the data given, and evaluate evidence or authority (p. 118).

According to the American Association for Agricultural Education, Doerfert (2011) stated skills needed for success in the 21st century workforce are far more complex than having a solid foundation in factual knowledge. Critical thinking is one of the most important attributes for students' success in the 21st century (Huitt, 1998). Students benefit from critical thinking skills by building skills such as; identifying relationships in concepts and decisions to express their beliefs, drawing reasonable conclusions, assessing the credibility of statements, and assessing the strength of information provided (Facione, 1990).

Statement of the Problem

The National FFA Organization (2012) stated that career development events (CDEs) help to develop members' abilities in critical thinking. However the question is, do FFA activities enhance critical thinking skills? This study may provide evidence that FFA activities are stimuli to enhance critical thinking skills in Texas FFA members. The findings of this study could help teachers promote participation and increase support provided for FFA activities. Additionally, the findings of this study could provide insight into the areas where FFA members excel at critical thinking skills, as well as where FFA can improve their activities to help members grasp critical thinking skills.

Significance of the Problem

The number of students who need training for farm labor has significantly decreased over the past few decades, and the amount of students advancing to higher education to learn the basic skills for positions in the agricultural industry has increased (Talbert et al., 2007). According to Diamond (1997), in order for students to successfully graduate from college, they need to be proficient in critical thinking and problem-solving skills. Career skill building competitions, such as FFA activities, need to enhance the critical thinking skills of members in order for FFA to support increasing amounts of students to be successful in college.

Doerfert (2011) concluded future research should focus on learning environments in agricultural education and their impact of specific cognitive, affective, and psychomotor learning outcomes. Previous studies have stated that further research should to be conducted to examine the factors affecting critical thinking skills, and critical thinking

skill levels increase as time and experience progresses (Cano, 1990; Ricketts & Rudd, 2005). This study addressed these research suggestions by examining FFA activities as a learning environment that affects critical thinking skills as Texas FFA member's participation and involvement increases.

Purpose and Objectives

The three-circle model of agricultural education emphasizes equal components which include classroom/laboratory instruction, SAE, and FFA (Phipps & Osborne, 1988). This study focused primarily on the FFA component of agricultural education. The purpose of this study was to determine the effect of FFA activities on critical thinking skills of Texas FFA members in three-star FFA chapters. The objectives of this study are as follows:

1. Determine the critical thinking scores of Texas FFA members.
2. Determine which FFA activities produce the highest critical thinking scores.
3. Determine the relationship between the level of critical thinking skills of Texas FFA members and their years of experience participating in FFA activities.
4. Determine if there is a relationship between the level of critical thinking skills and gender.

Definition of Terms

Texas FFA – A statewide organization that strives to prepare students for premiere leadership, personal growth, and career success (Texas FFA, 2012).

FFA Activities—activities in this study include: Career Development Events (CDE), Leadership Development Events (LDE), officer positions, leadership workshops/seminars, conventions, and state degrees.

Career Development Events—Build on what is learned in agricultural classes and encourage members to put their knowledge into practice. These events are designed to help a member prepare for a career in agriculture by testing and challenging the student's technical, leadership, interpersonal, and teamwork skills as well as their knowledge of the subject matter (Texas FFA, 2012). National FFA (2012) states that CDEs "help students develop the abilities to think critically, communicate clearly, and perform effectively in a competitive job market". National FFA includes all of the events Texas FFA considers CDEs as well as the events Texas FFA considers LDEs.

Leadership Development Events—Events only found in Texas, that focus on creating situations for members to demonstrate their abilities in public speaking, decision-making, communication and their knowledge of agriculture and the FFA organization (Texas FFA, 2012).

Critical Thinking Skills— Pascarella and Terenzini (1991) nicely combine several critical thinking definitions and stated that critical thinking "typically involves the individual's ability to do some or all of the following: identify central issues and assumptions in an argument, recognize important relationships, make correct inferences from data, deduce conclusions from information or data provided, interpret whether conclusions are warranted on the basis of the data given, and evaluate evidence or authority (p. 118).

Officer Positions—a leadership role at the chapter, district, and/or area level.

Leadership Workshops/Seminars—events at the district, area, state, and national level that provide opportunities for FFA members to develop and refine skills to becoming a leader (Texas FFA, 2012).

Conventions—meetings at the district, area, state, and national level that allow students to network, compete in various events, listen to motivational speeches, run/vote for varying levels of offices, and vote for business changes that may need addressing (Texas FFA, 2012).

State Degrees—the third degree received at the state level. In Texas the state degree is referred to as the Lone Star Degree. In order to obtain a Lone Star degree the student must: be an active FFA members for two years, have completed 360 hours of agricultural education, earned and invested $1000 or worked at least 300 hours (or a combination of the two), be able to demonstrate leadership abilities (by performing ten procedures of parliamentary law, giving six minute speech on agriculture or FFA, and serving as an officer, committee chairperson, or member of a chapter committee), have participated in planning and completion of chapter Program of Activities, have participated in five FFA activities about chapter level, and have a scholarship need (Texas FFA, 2012).

FFA Member—an agricultural education student on a chapter roster that is submitted to the National FFA Organization (National FFA, 2012).

Three-star chapters— Chapters that receive a gold rating by their state FFA associations are eligible to compete for the National FFA three-star, two-star, or one-star ratings. The

chapters that are rated three-stars are the top/most active chapters in the state (National FFA, 2012).

Limitations

A limitation of this study is the correlation between students' scores on the critical thinking appraisal and FFA activities cannot imply FFA activities are the sole reason that students have a higher or lower critical thinking score. Fraenkel, Wallen, and Hyun (2012) state "correlational studies do not…establish cause and effect" (p. 332). The study purposively selected three-star chapters in Texas and examined a census of senior FFA members in those chapters who have been on the chapter's roster for a minimum of two years. Therefore another limitation to this study is that within the census group, only 150 senior Texas FFA members from three-star FFA chapters were assessed. Using a purposively selected group and having a small sample size will decrease generalizability of results.

Basic Assumptions

The assumptions of the researcher are as follows:

1. All agricultural education teachers administered the instrument in a similar environment under similar conditions.
2. Students being examined answered the questions honestly and to the best of their ability.
3. The instrument evaluated the appropriate critical thinking skills.
4. The instrument was only administered to students who fall into the respected sample groups in the study.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this study was to determine the effect of FFA activities on critical thinking skills of senior Texas FFA members in three-star FFA chapters. Three-star chapters were used to ensure students were provided ample opportunities to be active in various FFA activities. The objectives of this study are as follows:

1. Determine the critical thinking scores of Texas FFA members.
2. Determine which FFA activities produce the highest critical thinking scores.
3. Determine the relationship between the level of critical thinking skills of Texas FFA members and their years of experience participating in FFA activities.
4. Determine if there is a relationship between the level of critical thinking skills and gender.

The researcher conducted a detailed literature review to identify relevant research as well as a theoretical framework to support the purpose and objective of this study. The review of literature pertains to critical thinking and how it relates to agricultural education.

Agricultural Education

Sponsored by Senator Hoke Smith and Representative Dudley Hughes, the Smith-Hughes Act of 1917 provided vocational education programs to be implemented for students in high school and was administered by the Federal Board for Vocational Education (Tenney, 1977). Meanwhile, states began to form their own state board of

vocational education (Tenney, 1977). The states would have to submit a plan to the federal board to be approved and the state and federal boards would split half of the cost to fund the programs (Tenney, 1977). In Virginia, the Future Farmers club was formed for boys in agricultural classes in the early 1920s (*Official FFA Manual*, 2012). The word spread of the Future Farmers club in Virginia, which inspired the establishment of the national organization in 1928 in Kansas City, Missouri (*Official FFA Manual*, 2012).

Since the establishment of the Future Farmers of America (FFA) in 1928, the National FFA Organization has become one of the largest youth organizations available in public schools (*Official FFA Manual*, 2012). Research suggests that FFA motivates students to participate in career-related activities, enhances self-confidence and citizenship (Brown, 2002), and produces leadership and life skills (Horstmeier & Ricketts, 2009). Furthermore, Croom and Flowers (2001) suggested the structure of FFA promotes students' self-actualization, self-esteem, and cognitive needs by engaging in meaningful activities.

The National FFA Organization (2012) stated that Career Development Events (CDEs) help promote students ability to think clearly. Additionally, research shows students enrolled in agricultural education have higher critical thinking skills than students enrolled in science, math, and English (Cano & Martinez, 1991). However, further research needs to be conducted to study the effect of FFA activities on members' critical thinking skills. The purpose of this study is to expand research in critical thinking by examining the critical thinking skills of Texas FFA members and determine which FFA activities increase critical thinking skills.

Critical Thinking

Many critical thinking theorists believe that an educational goal is to prepare students to who actively engage in critical thinking. Rudd (2006) posited, "Critical thinking is about reasoning, reflecting, introspection, purpose, and solutions" (p.4). Critical thinking philosophies have a long history and date back to Dewey (1933), who thought there were three attitudes necessary to critical thinking: open mindedness, responsibility and wholeheartedness. Glaser (1941) stated critical thinking is the "attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experiences; knowledge of the methods of logical inquiry and reasoning; and some skill in applying those methods" (p. 5-6).

Some 50 years later, critical thinking skills were defined as skills including the ability to clearly define, judge information, and solve problems to draw reasonable conclusions (Sternberg & Baron, 1985). As stated previously, Pascarella and Terenzini (1991) nicely combine several critical thinking definitions and stated that critical thinking

> …typically involves the individual's ability to do some or all of the following: identify central issues and assumptions in an argument, recognize important relationships, make correct inferences from data, deduce conclusions from information or data provided, interpret whether conclusions are warranted on the basis of the data given, and evaluate evidence or authority (p. 118).

Therefore, in order for students to be proficient in critical thinking skills they must obtain a level of competency over knowledge. Huitt (1998) inferred critical thinking is

one of the most important attributes for success in the 21st century. According to Pithers and Soden (2000), students must learn more than the content to develop critical thinking skills. Student's ability to understand and use information is being emphasized (Richardson, 2003) and an increased amount and variety of opportunities for enhancing critical thinking skills should be provided (Ricketts & Rudd, 2005).

Facione (1990) believed students can benefit from various critical thinking skills because they are capable of identifying relationships in concepts and decisions to express their beliefs, drawing reasonable conclusions, assessing the credibility of statements, and assessing the strength of information provided. Additionally, Facione (1990) stated:

> The ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit (p. 3).

Therefore, critical thinking should be occurring in secondary-level agricultural education classrooms and laboratories (Edwards, 2003).

Gender as an indicator of critical thinking has been widely studied, but several studies have come to different conclusions. Some research suggest that gender does not have an effect on critical thinking scores and there is not a relationship between the two

(Facione, Giancarlo, and Facione,1993; Friedel, Irani, Rudd, Gallo, Eckhardt, and Ricketts,2008). On the other hand, some studies suggest females tend to have higher levels of critical thinking (Rudd, Baker, & Hoover, 2000; Walsh, 1996; Wilson, 1989), and different studies have shown that males score higher on critical thinking assessments (Simon & Ward, 1974).

In developing the norm group to test the Watson-Glaser Critical Thinking Appraisal (WGCTA), Watson and Glaser had a representation of half males and half females to ensure equal representation of gender (Watson & Glaser, 1980). Watson and Glaser (1980) have viewed critical thinking as

> … a composite of attitudes, knowledge, and skills. [The] composite includes: (1) attitudes of inquiry that involve an ability to recognize the existence of problems and an acceptance of the general need for evidence in support of what is asserted to be true; (2) knowledge of the nature of valid inferences, abstractions, and generalizations in which the weight of accuracy of different kinds of evidence are logically determined; and (3) skills in employing and applying the above attitudes and knowledge. (p. 1)

When developing the WGCTA, Watson and Glaser based the five subtests of the appraisal from Dressel and Mayhew (Watson & Glaser, 1980). Dressel and Mayhew (1954) posited the abilities related to the concept of critical thinking are the ability to define a problem, select pertinent information for the solution of a problem, recognize stated and unstated assumptions, formulate and select relevant and promising hypotheses, and draw valid conclusions and judge the validity of inferences. The five

subtests that Watson and Glaser (1980) present in the Watson-Glaser Critical Thinking Appraisal are inference, recognition of assumptions, deduction, interpretation, and evaluation of arguments. Watson and Glaser (1980) define the five subtests as follows:

- Inference-"Discriminating among degrees of truth or falsity of inferences drawn from given data" (p. 2).
- Recognition of Assumptions- "Recognizing unstated assumptions or presumptions in given statements or assertions" (p. 2).
- Deduction- "Determining whether certain conclusions necessarily follow from information in given statements or premises" (p. 2).
- Interpretation- "Weighing evidence and deciding if generalizations or conclusions based on the given data are warranted" (p. 2).
- Evaluation of Arguments- "Distinguishing between arguments that are strong relevant and those that are weak or irrelevant to a particular question at issue (p. 2).

Research has shown that students score highest on the interpretation subtest (Simon & Ward, 1974; Gadzella, Ginther, & Bryant, 1996) and lowest on the evaluation of arguments subtest (Simon & Ward, 1974). However, Loo and Thorpe's (1999) results suggested the evaluation of arguments subtest was the highest scoring subtests and interpretation is the lowest. Therefore, the purpose of this study is to examine the effect of the FFA component of agricultural education in enhancing FFA members' critical thinking skills.

Critical Thinking in Agricultural Education

Abilities such as open mindedness, responsibility, logical inquiry and reasoning, problem solving, drawing reasonable conclusions, assessing the credibility of statements, and assessing the strength of information provided are often described when referring to critical thinking skills (Dewey, 1933; Facione, 1998; Glaser, 1941). Doerfert (2011) stated skills needed for success in the 21st century workforce are far more complex than having a solid foundation in factual knowledge. An employee must be competent in communication skills, teamwork, and complex problem-solving skills to accommodate for an evolving career field (Doerfert, 2011). Therefore, it is evident that agricultural educators and leadership trainers should provide a wide variety of educational stimulants to promote the enhancement of the potential critical thinking skills listed above (Ricketts & Rudd, 2004; Rollins, 1990). Previous studies have determined critical thinking is an important part of agricultural education and should be occurring amongst all students involved in the agricultural education program (Edwards, 2003; Ricketts & Rudd, 2004).

Darling-Hammond, Foundation, Barron, and Pearson (2008), concluded meaningful learning will occur when learners excel past factual memorization and obtain the ability to understand concepts in new environments, think creatively, and solve problems. Multiple studies have examined critical thinking skills in agricultural education environments and have determined critical thinking skills do occur (Burris & Garton, 2006; Cano, 1990; Rollins, 1990). According to Cano and Martinez (1991), students enrolled in agricultural education have increased critical thinking scores over

students in science, English, or social studies. Therefore, prior research suggests agricultural education is highly valued in its ability to enhance critical thinking skills.

Theoretical Framework

The theoretical framework for this study is based off of Beyer's (1987) theory of how best to teach thinking which includes six stages: 1. Introduction, 2. Guided practice, 3. Independent application, 4. Transfer and elaboration, 5. Guided practice, and 6. Autonomous use. Beyer (1987) posited that, "Establishing and maintaining a structure that facilitates the teaching and learning of thinking is extremely important to improving student thinking" (p. 83). According to Tishman and Andrade (1996), students' disposition of critical thinking can be improved by instructional methods that promote critical thinking.

Stedman and Adams (2012) defined Beyer's six stages as follows:

1. Introduction-"the initial instruction related to a specific thinking skill, usually a single lesson" (p. 118).
2. Guided Practice- "lessons in practical execution of the skill with instructive guidance" (p. 118).
3. Independent application- "repeated opportunities for students to practice the skill on their own" (p. 118).
4. Transfer and elaboration- "shows students how to apply previously learned skill to a new setting" (p. 118).
5. Guided Practice- "repeated practical execution in the new setting" (p. 118).

6. Autonomous use- “students demonstrate ability to use thinking operation on one’s own” (p. 118).

Connections across learning environments can be strengthened when students are involved in extracurricular or intracurricular activities (Brown & Theobald, 1998). Prior research shows critical thinking occurs in agricultural education environments and students enrolled in agricultural education have increased critical thinking scores over students in science, English, or social studies (Burris & Garton, 2006; Cano, 1990; Cano and Martinez 1991; Rollins, 1990).

As illustrated in Figure 1, the three components of agricultural education, classroom/laboratory instruction, FFA, and Supervised Agricultural Experience (SAE), provide the six stages of teaching critical thinking provided by Beyer’s (1987) research. The classroom/laboratory instruction provides an introduction to the curriculum, guided practice, and independent practice. SAEs and FFA activities also provide students with the opportunity to transfer the knowledge they learned in the classroom/laboratory instruction to a new setting with guided practice from their agricultural science teacher. Agricultural education students complete Beyer’s (1987) six stages by being required to operate their own SAE project and utilizing decision-making skills in various FFA activities in the autonomous use stage.

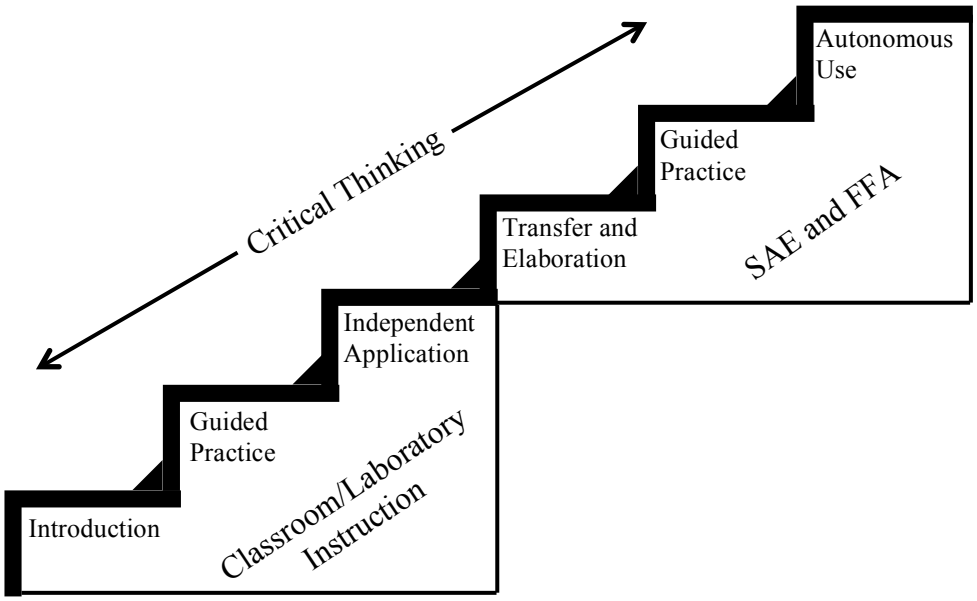

Figure 1. Critical Thinking in Agricultural Education. This figure implies that all three components of agricultural education can be a tool in implementing Beyer's (1987) six stages of teaching critical thinking.

Summary of Literature Review

Several studies have examined the level of critical thinking skills of students enrolled in agricultural education courses, but limited research has studied the level of critical thinking skills developed in the separate components of agricultural education. Although Thomas (1992) suggested providing a real-life situation environment supports higher order thinking skills, which is the most fundamental principle of some FFA activities, the study did not examine the effect of FFA activities relevance directly related to enhancing critical thinking skills.

CHAPTER III

METHODOLOGY

Research Design

The purpose of this study was to determine the effect of FFA activities on critical thinking skills in Texas FFA members. The objectives of this study were as follows:

1. Determine the level of critical thinking skills of Texas FFA members.
2. Determine which FFA activities produce the highest critical thinking scores.
3. Determine the relationship between the level of critical thinking skills of Texas FFA members and their years of experience participating in FFA activities.
4. Determine if there is a relationship between the level of critical thinking skills and gender.

This study was a descriptive-correlational study examining the critical thinking level of FFA members, as well as if any of the FFA activities are an indicator of critical thinking. According to Frankel, Wallen, and Hyun (2012), a correlational design describes the relationship between two or more quantitative variables. This descriptive study examined the effect that FFA activities have on critical thinking skills of Texas FFA members classified as seniors who have been on the chapter's roster for a minimum of two years in three-star chapters. A census of 150 senior FFA members from the participating chapters was used. The test scores of the sample group were used to

compare the critical thinking scores of senior members and the FFA activities in which they participated.

Population and Sample

The generalizable population was senior FFA members in three-star chapters who have been on the chapter's roster for a minimum of two years chapters who completed the Watson-Glaser Critical Thinking Appraisal exam. A three-star chapter is one that receives a gold rating by their state and is then determined by the national chapter ranking system as one of the elite chapters in the nation (National FFA, 2012). Given the necessity of the participants for this study to have multiple experiences in FFA activities, we targeted three-star chapters in the state of Texas. A census was attempted of the senior FFA members who have been on the chapter's roster for a minimum of two years in the three-star chapters in Texas that agreed to participate in the study. However only sixty-five FFA members completed the instruments, which resulted in a 43% response rate. This study examined seniors from three-star chapter to ensure that the FFA members tested are from active chapters throughout Texas, and have had more time in FFA to participate in FFA activities.

Instrumentation

The instrument used to examine the Texas FFA members' level of critical thinking skills is the Watson-Glaser™ Critical thinking Assessment Form A (WGCTA). Previous studies have deemed the WGCTA reliable by reporting a Cronbach's alpha internal consistency score ranging between .69 and .85, and the test-retest reliability was reported to be .73 (Watson & Glaser, 2008). With this evidence, the WGCTA has been

deemed reliable. External validity has been established by studies reporting that students enrolled in laboratory-centered classes (Sorenson, 1966) and learning through an experiential approach (Agne & Blick, 1972) score higher on the WGCTA than students enrolled in a lecture-based class. Therefore, results from various studies have deemed the instrument valid.

The instrument uses five subtests to measure critical thinking skills: Inference, Recognition of Assumptions, Deduction, Interpretation, and Evaluation of Arguments. Within the five subtests, "exercises include problems, statements, arguments, and interpretations of data similar to those that are encountered on a daily basis at work, in the classroom, and in newspaper and magazine articles" (Watson & Glaser, 2008, p. 2). Table 3.1 illustrates the percentile rankings used to compare the scores of the sample group and which FFA activities they competed in (Watson & Glaser, 1980). Since this study assessed senior FFA members, the Grade 12 scores were used to determine the FFA members' critical thinking percentile rankings. Watson and Glaser (1980) tested the WGCTA using a norm group "based on a sample of school districts systematically selected with respect to geographic region, and the size and socioeconomic status of the communities served by the school districts" (p. 4). The WGCTA was used to produce quantitative data to obtain correlational scores between the senior FFA member's score and the FFA activity they were involved in.

Table 3.1

Norms for Raw Scores Corresponding to Designated Percentiles for High School Students (Forms A and B)

%tile	Grade 9	Grade 10	Grade 11	Grade 12	%tile
99	65-80	70-80	71-80	71-80	99
97	61-64	65-69	68-70	69-70	97
95	57-60	61-64	64-67	65-68	95
90	54-56	58-60	60-63	61-64	90
85	51-53	55-57	58-59	58-60	85
80	49-50	53-54	56-57	56-57	80
75	48	52	54-55	55	75
70	46-47	50-51	53	53-54	70
65	45	49	51-52	51-52	65
60	43-44	47-48	50	50	60
55	42	46	48-49	48-49	55
50	41	45	47	47	50
45	40	43-44	45-46	46	45
40	39	42	44	44-45	40
35	38	41	43	43	35
30	37	40	41-42	42	30
25	36	38-39	40	40-41	25
20	35	37	39	39	20
15	34	35-36	37-38	37-38	15
10	32-33	33-34	35-36	35-36	10
5	30-31	30-32	32-34	33-34	5
3	28-29	28-29	30-31	31-32	3
1	0-27	0-27	0-29	0-30	1
N	1676	1950	1844	1636	N
Mean	42.6	45.8	48.1	48.5	Mean
SD	8.7	9.7	9.9	9.9	SD

Note: This table was obtained from the Watson and Glaser Critical Thinking Appraisal: Forms A and B Manual (1980).

Data Collection and Analysis

An email was sent to the 20 three-star chapters in the state of Texas asking for their voluntary participation in the study. Eight out of the 20 schools replied and were willing to participate in the study. The eight participating schools had a total of 150 seniors and a census of senior FFA members was used. The agricultural science teachers were required to go through a training which was provided by the Texas A&M University's Institutional Review Board. It provided instruction on the process of conducting research and how to ethically collect the data. Then the agricultural science teachers who agreed to participate were sent instructions to complete the research instruments, consent/assent forms, and the appropriate number of demographic surveys and WGCTA booklets and scantrons. Once the teachers received all of the materials for the study, the researcher called them to go over the process of how to collect the data and answered any questions they had. The agricultural science teacher had all of the students sign the appropriate consent/assent (a consent form for those over the age of 18) and the FFA members under the age of 18 was presented with a parental consent form as well as an assent form for them to sign to ensure their willingness to participate in the study. The agricultural science teachers administered a paper-based version of the test to the students. Once consent/assent forms were returned, the agricultural education teachers administered the demographics survey and the WGCTA paper-based appraisal. Using Dillman's (2000) tailored design method; three follow-up reminder emails were sent to the teachers in three week interval periods.

Once all of the instruments were returned to the researcher, a coding number was assigned to each participant and printed on the demographic survey and their WGCTA scantrons. The coding number was used to correlate the students' FFA activities they participated in and their score on the WGCTA. Data analysis was conducted using the Statistical Package for Social Sciences for Windows version 22.0. Descriptive statistics were calculated and used in summarization of data to accomplish study objectives, including; frequencies, percentages, means, and standard deviations. Additionally, a Pearson Product Moment correlation was calculated to determine if there was a relationship between demographics and the FFA members score on the WGCTA.

CHAPTER IV

RESULTS

The purpose of this study was to determine the effect of FFA activities on critical thinking skills of Texas FFA members in three-star FFA chapters. Sixty-five FFA members took the Watson-Glaser Critical Thinking Appraisal (WGCTA) and answered the demographics survey, resulting in a 43% response rate. The findings of this study are presented based on the research objectives stated in Chapter I. Descriptive and correlation statistics were calculated and used to report the finding of this study's objectives.

Objective 1: FFA Members' Critical Thinking Scores

Determining the level of critical thinking skills of Texas FFA members was identified as the first objective by the researcher involved in this study. To accomplish this objective, students were asked to complete the WGCTA to determine their level of critical thinking. Table 4.1 shows mean scores were calculated for the FFA members who completed the WGCTA. FFA members could receive a total of 80 points on the WGCTA. Additionally, a mean score was calculated to determine which of the five subtests of the WGCTA the FFA members scored this highest on. FFA members could score a total of 16 points on each of the five subtests. The mean score for all FFA members who completed the survey was 39.85, which is considerably lower than the WGCTA 12th grade norm group at 48.5 (Watson & Glaser, 1980). Using the percentile rankings presented in Table 4.1, with a mean score of 39.85, the FFA members who

completed the WGCTA scored in the 25th percentile of high school students in the 12th grade (Watson & Glaser, 1980). The FFA members performed best on the Evaluation of Arguments subtest with a mean on 9.02 and scored lowest on the Inference subtest with a mean of 5.35.

Table 4.1

Descriptive Statistics for FFA members' scores on the Watson-Glaser Critical Thinking Appraisal (n=65)

WGCTA Total and Subtests	*M*	*SD*
WGCTA Total Score	39.85	6.76
Inference Subtest Score	5.35	2.57
Recognition of Assumptions Subtest Score	8.52	2.66
Deduction Subtest Score	8.48	1.88
Interpretation Subtest Score	8.48	2.51
Evaluation of Arguments Subtest Score	9.02	2.16

Note. WGCTA=Watson-Glaser Critical Thinking Appraisal

Objective 2: FFA Activities Predictor of Critical Thinking Scores

The second objective of this study was to determine which FFA activities predict the highest level of critical thinking scores. This objective was met by comparing what the students' answered on the demographic survey to their score on the WGCTA. In order to complete the demographic survey, FFA members indicated which FFA activities they competed in and at what level in which they competed. Additionally, they had to indicate how many years they were active in FFA as well as their gender. Table 4.2 reports the frequencies and percentages of the FFA members' participation in the following FFA activities and at what level they competed. The results show FFA

members were most involved in receiving a FFA degree (f = 60) and were least involved in speaking events (f = 12).

In order to determine the second objective, a regression analysis was used to correlate FFA members' scores on the WGCTA and the FFA activities in which they participated. As shown in Table 4.3, the only FFA activity that is an indicator of FFA members' critical thinking ability is the State LDE contest (*Sig.* = .01).

Objectives 3 and 4: FFA Members' Experience and Gender Differences in Relation to Critical Thinking Scores

This study outlined the third objective to explain the relationship between FFA members' years of experience in FFA and their critical thinking scores. To meet the third objective, the FFA members were asked to answer how many years they were active in FFA. The FFA members' scores on the WGCTA were then correlated to how many years of experience they have in FFA. The purpose of this objective was to investigate whether or not critical thinking scores differed based on how many years the students were active in FFA.

Table 4.2

FFA Members' Participation in FFA Events (n=64)

FFA Activities	*f*	%
Officer Position	23	35.9
Chapter	21	32.8
District	3	4.7
Area	0	0.0
State	0	0.0
Leadership Development Events (LDE)	37	57.8
District	30	46.9
Area	24	37.5
State	15	23.4
National	2	3.1
Career Development Events (CDE)	35	54.7
Area	28	43.8
State	22	34.4
National	0	0.0
Conventions	37	57.8
District	25	39.1
Area	31	48.4
State	31	48.4
National	17	26.6
Leadership Camps/Workshops	31	48.4
Chapter	25	39.1
District	25	39.1
Area	22	34.4
State	9	14.1
National	9	14.1
FFA Degrees	60	93.8
Discovery	10	15.6
Greenhand	35	54.7
Chapter	45	70.3
Lone Star	32	50.0
Speaking Events	12	18.8
District	8	12.5
Area	8	12.5
State	2	3.1
National	0	0.0

Note. Lone Star Degree is the state degree in Texas. Students could have marked that they were active in multiple levels of the activities; therefore, the frequencies listed in the activity level may not match the total frequency for the activity.

Table 4.3

Regression Analysis of Watson-Glaser Critical Thinking Appraisal Scores vs. FFA Activities (n-64)

FFA Activities	*B*	*Std. Error*	*B*	*t*	*Sig.*
Officer Position	3.66	5.30	.26	.69	.50
Chapter	-2.26	7.82	-.16	-.29	.78
District	-5.64	4.99	-.18	-1.13	.27
LDE	7.72	8.023	.58	.96	.34
District	-2.66	6.58	-.20	-.40	.69
Area	-.12	3.91	-.01	-.03	.98
State	9.26	3.29	.59	2.82	.01
National	-1.17	7.18	-.03	-.16	.87
CDE	1.24	5.92	.09	.21	.84
Area	2.62	5.47	.20	.48	.64
State	.30	2.90	.02	.10	.92
Conventions	5.54	5.06	.41	1.09	.28
District	-2.75	5.13	-.20	-.54	.60
Area	-2.20	4.26	-.17	-.52	.61
State	-1.69	4.75	-.13	-.36	.72
National	-1.48	5.33	-.10	-.28	.78
Leadership Camps/Workshops	-10.66	6.62	-.80	-1.61	.12
Chapter	-6.67	5.30	-.49	-1.26	.22
District	9.16	5.54	.68	1.65	.11
Area	1.02	3.88	.07	.26	.79
State	-.17	6.65	-.01	-.03	.98
National	1.88	6.00	.10	.31	.76
FFA Degrees	-1.36	4.41	-.05	-.31	.76
Discovery	5.85	3.80	.32	1.54	.13
Greenhand	-1.24	3.10	-.09	-.40	.69
Chapter	-.13	3.23	-.01	-.04	.97
Lone Star	-2.21	3.43	-.17	-.65	.52
Speaking Events	-5.00	9.04	-3.0	-.55	.58
District	-.70	7.40	-.04	-.10	.93
Area	3.72	6.48	.19	.57	.57
State	14.92	7.98	.39	1.87	.07

Note. Lone Star Degree is the state degree in Texas. The following FFA activities are not represented in this table due to the lack of participation by the research participants: Area and State Officer Positions, National CDE, and National Speaking Events.

Objective four was investigated to determine the differences in critical thinking scores between male and female FFA members. To study the fourth objective, the students were asked to answer if they were male or female on the demographic survey and their answer was then correlated to their score on the WGCTA. As shown in Table 4.4, females' (M = 42.17) average scores were higher on the WGCTA than males' (M = 36.63) average score. The statistical significance was not determined because a t-test was not calculated due to not having two groups larger than 30 participants. However, these results are practically significant with the females scoring in the 30th percentile and the males scoring in the 10th percentile of the WGCTA norm group.

Table 4.4

Differences in FFA Members' Critical Thinking Scores based on Gender

Gender		*M*	*SD*
Female	36	42.17	6.98
Male	27	36.63	4.78

In order to outline the third and fourth objectives, a regression analysis was used to correlate FFA members' scores on the WGCTA and their demographics. As shown in Table 4.5, gender is an indicator of FFA members' critical thinking ability (*Sig.* = .02), whereas years of experience (*Sig.* = .57) is not an indicator of critical thinking ability.

Table 4.5

Regression Analysis of Watson-Glaser Critical Thinking Appraisal Scores vs. Demographics (n-64)

Demographics	*B*	*Std. Error*	*β*	*t*	*Sig.*
Years of Experience	-.783	1.377	-.113	-.568	.57
Gender	6.281	2.430	.468	2.585	.02

To further investigate the third and fourth objectives, a Pearson Product Moment correlation was calculated to determine if there was a relationship between demographics and the FFA members score on the WGCTA. This study used Davis (1971) as a guideline for interpreting the magnitude of correlational coefficients with .70 or higher being identified as a very strong correlation, .50 to .69 as a substantial correlation, .30 to .49 as a moderate correlation, .10 to .29 as a low correlation, and .01 to .09 as a negligible correlation. Therefore, table 4.6 shows a moderate correlation between gender (r = .41) and scores on the WGCTA and a low correlation between FFA members years of experience (r = .19) and scores on the WGCTA.

Table 4.6

Correlation between FFA members' Watson-Glaser Critical Thinking Appraisal Scores and Demographics (n=63)

Demographics	WGCTA Scores (r)
Years of Experience	.19
Gender	.41

CHAPTER V

SUMMARY, CONCLUSIONS, & RECOMMENDATIONS

Based on the findings and results presented in Chapter IV, several conclusions, implications, and recommendations can be drawn about the effect of FFA activities on critical thinking skills of Texas FFA members in three-star FFA chapters. In addition, recommendations for practice and further research are discussed.

Purpose and Objectives

The purpose of this study was to determine the effect of FFA activities on critical thinking skills of Texas FFA members in three-star FFA chapters. The objectives of this study were:

1. Determine the level of critical thinking skills of Texas FFA members.
2. Determine which FFA activities produce the highest critical thinking scores.
3. Determine the relationship between the level of critical thinking skills of Texas FFA members and their years of experience participating in FFA activities.
4. Determine if there is a relationship between the level of critical thinking skills and gender.

Summary of Methodology

A study of senior FFA members in eight three-star FFA chapters in Texas was conducted to assess the FFA members' level of critical thinking critical thinking. This

study was a descriptive-correlational design using a regression analysis. According to Frankel, Wallen, and Hyun (2012), a correlational design describes the relationship between two or more quantitative variables. Three-star chapters were purposively chosen in order to ensure students had ample opportunity to compete in various FFA activities.

An email was sent to the 20 three-star chapters in Texas asking for their willingness to participate in the study. Eight of the 20 schools agreed to participate in the study. The eight participating schools had a total of 150 seniors and a census of senior FFA members will be used.

The generalizable population was senior FFA members in the eight three-star chapters who completed the Watson-Glaser Critical Thinking Appraisal exam. A census was attempted of the 150 senior FFA members in the three-star chapters in Texas that agreed to participate in the study, but only 65 members actually participated. To ensure participants were from active chapters, the study used three-star chapters in Texas. Also, senior FFA members were studied to make sure they have had more time to participate in FFA activities.

The WGCTA was used to examine the level of critical thinking skills of the senior Texas FFA members examined in this study. There are five subtests examined in the WGCTA: Inference, Recognition of Assumptions, Deduction, Interpretation, and Evaluation of Arguments. Watson and Glaser (2008) posited that the "exercises include problems, statements, arguments, and interpretations of data similar to those that are encountered on a daily basis at work, in the classroom, and in newspaper and magazine articles" (p. 2). The WGCTA was used to produce quantitative data to obtain

correlational scores between the senior FFA member's score and the FFA activity they were involved in.

An initial email was sent to all of the agricultural science teachers who taught in the 20 three-star chapters in the state of Texas. Agricultural science teachers from eight schools replied and were willing to conduct the research. All of the research materials were sent to the agricultural science teachers who agreed to conduct the research. In order to conduct the research, the agricultural science teachers had to obtain permission forms from every student who was willing to participate in the study. Then, the agricultural science teacher had the students complete the demographics survey and the WGCTA Form A to collect data for the study. Once all the data was collected, the agricultural science teachers mailed back the forms to Texas A&M University for data analysis.

The data analysis process consisted of assigning a coding number to each participant. Descriptive statistics were generated and used in summarization of data to accomplish study objectives, including; frequencies, percentages, means, and standard deviations. Additionally, a Pearson Product Moment correlation was calculated to determine if there was a relationship between demographics and the FFA members score on the WGCTA.

Summary of Findings

This study provided insight into the effect of FFA activities on FFA members' critical thinking skills. Although these results are not generalizable to all FFA members,

they provide an understanding of the level of critical thinking skills of FFA members, as well as which FFA activities indicate the highest critical thinking scores.

Objective 1: FFA Members' Critical Thinking Scores

According to Edwards (2003), critical thinking should be occurring in the secondary-level agricultural education classrooms and laboratories. The results of this study indicate that critical thinking is occurring at a low level with the mean score for all FFA members who completed the WGCTA of 39.85 out of a possible score of 80. This places the senior FFA members who participated in this study in the 25th percentile of 12th grade high school students (Watson & Glaser, 1980). These results indicate a need for agricultural education to strive to improve critical thinking skills in FFA members. This could be done by teachers referring the model in the theoretical framework which suggest how the three agricultural education components can be used as a tool to implement Beyer's (1987) stages of teaching critical thinking.

Additional research has provided evidence that students score high on the Interpretation subtest (Simon & Ward, 1974; Gadzella, Ginther, & Bryant, 1996) and lowest on the Evaluation of Arguments subtest (Simon & Ward, 1974; Loo & Thorpe, 1999). However, this study's results align with the findings in Loo and Thorpe's (1999) study that suggested the Evaluation of Arguments subtest was the highest scoring subtests and Interpretation is the lowest. The senior FFA members had the highest mean of 9.02, out of 16, on the Evaluation of Arguments subtest, and the lowest mean of 5.35 on the Inference subtest.

It can be concluded from the results of this study that senior FFA members in three-star chapters in Texas are most proficient at determining the strength of an argument and whether or not the argument is relevant to the question at issue. Seeing that the senior FFA members who participated in this study scored lowest in the Inference subtest, a conclusion can be made that they have the most trouble differentiating between true and false statements which are presented in the inferences drawn from given data. Therefore, Texas FFA should strive to enhance the tasks in FFA activities that could develop inference skills in FFA members. This could be done by implementing categories/classes in FFA activities that enhance students' ability to draw inferences from data given to them.

Objective 2: FFA Activities Predictor of Critical Thinking Scores

The results indicated the FFA members who participated in this study were most involved in receiving a FFA degree and were least involved in speaking events. However, the only FFA activity that was an indicator of critical thinking was the State Leadership Development Event (LDE). It can be concluded in this study the FFA members who participated in the State LDE Contest could have higher critical thinking skills than the FFA members who competed in any other FFA activity. Therefore, FFA should evaluate the skills needed to advance to the State LDE Contest and try to implement those skills in other FFA activities. This could allow FFA to find which section of the State LDE Event is indicating critical thinking and why members' who compete in this activity have higher critical thinking scores.

Objectives 3 and 4: FFA Members' Experience and Gender Differences in Relation to Critical Thinking Scores

Some research suggests gender does not have an effect on critical thinking scores and there is not a relationship between the two (Facione, Giancarlo, and Facione,1993; Friedel, Irani, Rudd, Gallo, Eckhardt, and Ricketts,2008). The findings were practically significant with the female scoring in the 30th percentile and the males scoring in the 10th percentile of the norm group. The results of this study contradict the previous study by providing evidence that the females' average scores on the WGCTA were higher than males' average score. Therefore, the results from this study support the studies that suggested females tend to have higher levels of critical thinking (Rudd, Baker, & Hoover, 2000; Walsh, 1996; Wilson, 1989). A conclusion can be made from these results that the female FFA members in three-star chapters in Texas are more proficient at critical thinking than the male FFA members. This could mean that the females are able to draw inferences, recognize assumptions, utilize deduction, interpret evidence, and evaluate arguments at a higher level than males (Watson & Glaser, 1980).

The results of this study showed a high correlation between gender and critical thinking scores, but a low correlation between FFA members' years of experience and critical thinking scores. The high relationship between gender and critical thinking scores refers back to the finding, in this study, females scored higher on the WGCTA than males, and therefore have a higher level of critical thinking skills. The low relationship between FFA members' years of experience and critical thinking scores

suggests the longevity of a FFA member's experience in FFA may not make a difference in their critical thinking scores.

Conclusions

This descriptive study contributes to the growing literature on critical thinking in secondary agricultural education programs. The results of this study suggest the only FFA activity that is an indicator of critical thinking is the State LDE contest. Therefore, this study suggests most activities in FFA need to provide more critical thinking skill building activities. Additionally, agricultural science teachers should take action to implement critical thinking enhancement activities into their curriculum (Edwards, 2003). This would ensure that every student enrolled in the agricultural education program is working to improve his or her critical thinking skills. Since Huitt (1998) believed critical thinking is one of the most important attributes for success in the 21st century, the results to this study should be taken into consideration and action should be taken to improve FFA members' critical thinking skills. This can be done by using the FFA and SAE components of agricultural education in order to implement the highest three stages of Beyer's (1987) stages of teaching critical thinking.

Recommendations

Recommendations for Practice

Since FFA is only one component of the agricultural education curriculum, the other two components, Supervised Agricultural Experience and Classroom/Laboratory Instruction, can be used as a support system to enhance FFA members' critical thinking skills. It is important for teachers to incorporate active learning within their curriculum

to make the course more enjoyable for both themselves and the students (Duron, Limbach, & Waugh, 2005). A result of active learning is that it can cause students to think critically (Duron, Limbach, & Waugh, 2005). Additionally, teachers can effectively implement critical thinking in their curriculum by designing their instruction around Beyer's (1987) six stages of teaching critical thinking in the classroom.

The results of this study indicate a dire need for FFA and agricultural education to incorporate more critical thinking skill building elements into their activities. When implementing these elements into FFA contests and activities, they should think about the five subtests of the WGCTA: inference, recognition of assumptions, deduction, interpretation, and evaluation of arguments (Watson & Glaser, 1980). All of the WGCTA subtests are important elements to critical thinking. Therefore, both the National and Texas FFA should strive to implement activities to enhance students' ability to incorporate these five components of critical thinking.

Agricultural science teachers should take into consideration that FFA has the ability to support Beyer's (1987) highest three stages of teaching critical thinking: transfer and elaboration, guided practice, and autonomous use. FFA has the ability to support the transfer and elaboration stage by allowing teachers to provide students the opportunity to transfer their knowledge learned in the classroom/laboratory instruction to a new setting, this stage would occur during practice for various FFA activities. If done properly, agricultural science teachers can provide the guided practice stage by guiding students during the transfer of knowledge to a new setting. Then the students display the

autonomous use stage through the opportunity to use their knowledge in operation on their own in a contest.

Teacher educators should be spreading the word to future agricultural science teachers about the importance of implementing critical thinking enhancement strategies in their agricultural education programs. One way to do this would be by teaching what critical thinking is during their major classes. Teacher educators should provide detailed instruction teaching future agricultural science teachers how to enhance/incorporate students' critical thinking skills; such as, Inference, Recognition of Assumptions, Deduction, Interpretation, and Evaluation of Arguments. Additionally, teacher educators should teach future agricultural science teachers how to use FFA activities as a tool to enhance their students' critical thinking as explained in the previous paragraph.

Recommendations for Research

The results of this study provided insight to further research that could be conducted in the area of critical thinking in secondary agricultural education programs. One suggestion is to replicate this study on a larger scale to accumulate a larger general population. This would allow research to more accurately describe the critical thinking skills of Texas FFA members and which FFA activities are indicators of critical thinking.

Another recommendation for further research is to replicate the methods of this study, but to be more specific and find out which events at the state LDE contest are predictors of critical thinking. This would provide evidence of which events are the students active in that score highest on critical thinking assessments. Furthermore, CDEs

could be broken down into each event to see if any of the contests are an indicator of critical thinking. This investigation could show if any of the CDEs are indicators of critical thinking, or if none of the CDEs enhance critical thinking.

A qualitative study should be conducted to interview teachers on why they believe the results of this study indicate that FFA activities, with the exception of state LDEs, are not indicators of critical thinking. Additionally, the agricultural science teachers should be asked how they believe FFA activities could be improved to help enhance FFA members' critical thinking skills. This could provide insight into the reason why these results suggests that most FFA activities are not an indicator of critical thinking, and how to improve the FFA activities in which FFA members compete.

The results of this study indicate a need for future research to be conducted on how agricultural education can improve students' ability to think critically. This could be done by using a mixed-methods study to interview a panel of teacher, administrator, and teacher educators on how they believe critical thinking skills can be improved in students enrolled in agricultural education classes. Then a survey should be made from the interview findings in order to determine how to improve critical thinking skills on a larger scale. Additionally, research should be conducted by testing students' abilities to think critically as well as the asking the teacher what strategies they use in their agricultural education programs to help enhance critical thinking skills.

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APPENDIX A

AG TEACHER INITAIL RECRUITMENT EMAIL

SUBJECT: Request for students' participation in research study on FFA activities' effect on critical thinking skills.

Dear (FFA Advisor),
My name is Lindsey Latham and I am currently a graduate student in the Department of Agricultural Leadership, Education and Communications at Texas A&M University. A vital component of a well-rounded agricultural education program is students' participation in FFA activities. I am conducting a study for my master's thesis project entitled, "The Influence of FFA Activities on Critical Thinking Skills in Texas Three Star Chapters," to identify the effect various FFA Activities have on critical thinking skills. The results of this study will provide information regarding which FFA activities, if any, yield the highest in enhancing critical thinking skills in FFA members. According to the 2012 National Chapter Award Application, your FFA chapter was selected as a three star chapter in the state of Texas. Therefore, your chapter has been selected for participation in this study. Students classified as seniors and who are members of your FFA chapter have the opportunity to assess their critical thinking skills and provide information regarding which FFA activities they participated in. I would like to request your participation in this study by administering the paper-based Watson-Glaser Critical Thinking Appraisal and a demographics form for senior FFA members to list activities they have participated in during their FFA career. This should take approximately one hour to complete. The assessment booklets will be provided for you as the advisor to administer to the selected senior FFA members in your chapter at the selected time of your earliest convenience.
Members' participation is voluntary and the assessment scores and the FFA activities participation will be treated confidentially. Members may choose at any time to withdraw from the study without penalty. The risks associated with this project are not greater than those ordinarily encountered in daily life. Thank you for taking the time to consider your chapter's involvement in this study about FFA activities effect on critical thinking skills. If you have any questions about this project, please feel free to call Lindsey Latham at (979)845-7557 or Dr. John Rayfield at (979)862-3707. Should you agree to participate, please respond to this email at your earliest convenience and include the number of FFA members classified as seniors in your FFA chapter.
Sincerely,
Lindsey E. Latham
Graduate Teaching Assistant
Texas A&M Agriculture and Life Sciences
Agricultural Leadership, Education, and Communications
237 AGLS Building, 2116 TAMU

College Station, TX 77843-2116
(O): (979)845-7557
(C): (903)918-9835
lindsey.latham@agnet.tamu.edu

Dr. John Rayfield
Assistant Professor
Texas A&M Agriculture and Life Sciences
Agricultural Leadership, Education, and Communications
240 AGLS Building, 2116 TAMU
College Station, TX 77843-2116
(979) 862-3707
jrayfield@tamu.edu

APPENDIX B

STAR CHAPTER'S IN TEXAS

This is a list of the star chapters in Texas. The three-star chapters used in this study are highlighted. This is publically available and was obtained from https:/ www.ffa.org/programs/awards/nationalchapter/Pages/default.aspx. Below this list is a copy of the webpage the list was obtained from with the link that directs you to the list circle in red.

Texas

Allen HS FFA	Three Star	Alvord FFA	Two Star
Anderson Shiro HS FFA	One Star	Axtell FFA	One Star
Bellaire HS FFA	Two Star	Bellville HS FFA	One Star
Bridgeport HS FFA	Two Star	Brownsboro HS FFA	One Star
Bryan HS FFA	One Star	Bullard HS FFA	One Star
Byron Nelson FFA	One Star	Calallen FFA	Two Star
Canyon Lake FFA	One Star	Cedar Park HS FFA	Two Star
Center Point HS FFA	Two Star	City View FFA	One Star
Clear Brook HS FFA	Two Star	Clear Falls FFA	Two Star
Clear Lake FFA	Two Star	Clear Springs FFA	Three Star
Coldspring HS FFA	Two Star	Colorado HS FFA	Three Star
Columbus HS FFA	Three Star	Crawford FFA	One Star
Crowley FFA	Two Star	Cy Lakes FFA	One Star
Danbury HS FFA	One Star	Decatur HS FFA	Three Star
Edinburg Economedes FFA	Two Star	Fairfield HS FFA	Two Star
Florence FFA	Two Star	Forestburg HS FFA	Three Star
Frisco-Centennial FFA	Two Star	Gilmer HS FFA	Three Star
Granbury FFA	One Star	Grandview HS FFA	Two Star
Greenville HS FFA	Two Star	Gunter HS FFA	Two Star
Hallsville HS FFA	Three Star	Hargrave HS FFA	Two Star
Huntsville HS FFA	One Star	Iola HS FFA	Two Star
Katy HS FFA	Three Star	Kingwood FFA	Two Star
Kingwood Park FFA	One Star	Klein Forest FFA	Two Star
Klein HS FFA	Three Star	Krum HS FFA	Two Star
Lanier HS FFA	Three Star	Mabank HS FFA	Two Star
Manor HS FFA	One Star	Mansfield FFA	Three Star
McKinney FFA	Two Star	McKinney North FFA	Two Star
Mexia HS FFA	One Star	Midway HS FFA	One Star
Mission FFA	One Star	Morton Ranch FFA	Three Star
Mount Pleasant HS FFA	One Star	New Boston FFA	Three Star
Nimitz FFA	Three Star	Northwest FFA	Two Star
Pearland HS FFA	Two Star	Plano East Sr HS FFA	Two Star
Plano Sr HS FFA	Two Star	Plano West FFA	Three Star
Pleasanton HS FFA	One Star	Quanah HS FFA	Two Star
Rudder FFA	Two Star	Rusk HS FFA	Three Star
S&S Consolidated FFA	Two Star	Schulenburg FFA	Three Star
Sharyland FFA	One Star	Sheldon FFA	Two Star
Simms FFA	Two Star	Spring Branch FFA	Two Star
Tilden FFA	Two Star	Tomball HS FFA	Two Star
Troy HS FFA	Two Star	Veterans Memorial HS FFA	Two Star
Waskom HS FFA	Two Star	Weatherford HS FFA	Two Star
Weimar FFA	Three Star	Winona FFA	Three Star

APPENDIX C

PROTOCOL DIRECTIONS/RECRUITMENT SCRIPT

Protocol Directions for Agricultural Science Teachers:

1. Since you will be conducting the recruitment of your students' participation in this research study, please take a few minutes to look through the 12 slide "Alternative Training" PowerPoint. This will ensure that you are properly trained to assist the principal investigator, Lindsey Latham, in conducting the research for this study.
2. Call a meeting with the seniors participating in this study. At the meeting, read through the recruitment script below to your students to ask for their willingness to participate in this study.
3. Please hand out the appropriate consent/assent forms to the students who are willing to participate.
    a. Students who are 18 and over need to sign the "Subject Consent Form" and return it back to you.
    b. Students who are under 18 need to sign the "Minor Assent Form" and have their parents sign the "Parental Permission Form" and return them back to you.
    c. Please make sure you have all of the consent/assent forms returned back to you before administering the assessment.
4. Once all of the consent/assent forms have been returned; set up a time to meet with all of the students participating.
5. At this meeting, you will administer the Demographics Survey and the Watson-Glaser Critical Thinking Appraisal Form A.
    a. First hand out the Demographics Survey and ask the students to fill out the questions on the survey. PLEASE CLEARLY INSTRUCT THE STUDENTS TO **NOT** PUT THEIR NAME ON THE INSTRUMENT.
    b. Then hand out the Watson-Glaser Critical Thinking Appraisal and read through the "Test Proctor Script" to the students for clear instructions on how to take the assessment.
6. Once the survey and assessment have been completed by all students, please mail all signed consent/assent forms, Demographic Surveys, and Watson-Glaser Critical Thinking Appraisal test booklets and answer sheets in the provided envelope addressed to the principal investigator, Lindsey Latham.

Directions for Recruitment Script:

Teachers, please read the following information to the students who have been randomly selected to participate in this study. If they are willing to participate, please have them sign the consent form if they are over 18 or get the parental permission form signed and sign the assent form if they are under 18.

Please read the following:

You have been selected and are invited to take part in a research study being conducted by Lindsey Latham, a researcher from Texas A&M University. The purpose of this study is to determine the influence that FFA activities have on critical thinking skills of FFA members. You are being asked to be in this study because you have been randomly selected out of all senior FFA members in three-star FFA chapters in the state of Texas who have been on their chapter's roster for a minimum of two years. If you decide you do not want to participate, there will be **no** penalty to you. The alternative to being in the study is not to participate. If you have not been randomly selected you will not be able to participate in this study.

To participate in this study, you will be asked to fill out a demographics survey and complete the Watson-Glaser Critical Thinking Appraisal. Your participation in this study will last up to one hour only one time and the test will be administered in your school's agricultural science department. If at any time during the assessment you decide you do not want to participate, you can place your pencil on your desk and hand your assessment into me (the teacher administering the test).

The records of this study will be kept private. No identifiers linking you to this study will be included in any sort of report that might be published. Research records will be stored securely and only John Rayfield, Lori Moore, and Lindsey Latham will have access to the records. Information about you will be stored in computer files protected with a password. This consent form will be filed securely in an official area. People who have access to your information include the Principal Investigator and research study personnel. Representatives of regulatory agencies such as the Office of Human Research Protections (OHRP) and entities such as the Texas A&M University Human Subjects Protection Program may access your records to make sure the study is being run correctly and that information is collected properly. Information about you and related to this study will be kept confidential to the extent permitted or required by law.

Your participation is voluntary and you have the choice whether or not to be in this research study. You may decide to not begin or to stop participating at any time. If you choose not to be in this study or stop being in the study, there will be no penalty. If you choose to stop participating in the middle of taking the test, you will just have to put your pencil down.

If you agree to participate in this study please collect the appropriate documentation to be signed from me (the agricultural science teacher). If you are 18 years of age or older, you will need to collect a consent form. If you are under the age of 18, you will need to collect a parental permission form and an assent form. The parental permission form will need to be signed by your parents and returned to me (the agricultural science teacher). The consent and assent forms will need to be signed by you, the student, and returned back to me (the agricultural science teacher).

APPENDIX D

MINOR'S ASSENT FORM

Influence of FFA Activities on Critical Thinking Skills of FFA members in Three-Star Chapters in Texas.

You are being asked to join a research study. This purpose of the research project is to determine the influence that FFA activities have on critical thinking skills of FFA members. To do this, we will need to test your critical thinking skills and ask you which FFA activities you have competed in.

You do not have to be in this research study and you can stop at any time. If you have any questions, you can talk to your parents or the person talking to you about this form.

Do you have any questions? Do you want to be in this research study?

_____
Minor's Name

_____ _____
Minor's Signature *(if applicable)* Date

_____ _____
Presenter's Signature Date

APPENDIX E

PARENTAL PERMISSION FORM

Project Title: Influence of FFA Activities on Critical Thinking Skills of FFA Members in Three-Star Chapters

You are invited to take part in a research study being conducted by Lindsey Latham, a researcher from Texas A&M University. **The information in this form is provided to help you and your child decide whether or not to take part. If you decide to allow your child to take part in the study, you will be asked to sign this permission form. If you decide you do not want your child to participate, there will be no penalty to you or your child, and your child will not lose any benefits they normally would have.**

Why Is This Study Being Done?
The purpose of this study is to determine the influence that FFA activities have on critical thinking skills of FFA members.

Why is My Child Being Asked to Be in This Study?
Your child is being asked to be in this study because they have been randomly selected out of all senior FFA members in three-star FFA chapters in the state of Texas who have been on their chapter's roster for a minimum of two years.

How Many People Will Be Asked To Be In This Study?
One hundred and fifty people (participants) will be invited to participate in this study. Overall, a total of 150 people will be invited at 20 study centers.

What Are the Alternatives to being in this study?
The alternative to being in the study is not to participate.

What Will My Child Be Asked To Do In This Study?
Your child will be asked to complete the Watson-Glaser Critical Thinking Appraisal as well as a demographic survey. Your child's participation in this study will last up to one hour only one time and the test will be administered in their school's agricultural science department.

Are There Any Risks To My Child?
The things that your child will be doing are no greater than risks than your child would come across in everyday life.

Will There Be Any Costs To My Child?
Aside from their time, there are no costs for taking part in the study.

Will My Child Be Paid To Be In This Study?
Your child will not be paid for being in this study.

Will Information From This Study Be Kept Private?
The records of this study will be kept private. No identifiers linking your child to this study will be included in any sort of report that might be published. Research records will be stored securely and only John Rayfield, Lori Moore, and Lindsey Latham will have access to the records.

Scores to the assessment and FFA activities responses will be stored online in a password-protected spreadsheet for approximately three years on the researcher's computer in the Agriculture and Life Sciences building at Texas A&M University in College Station and the paper-based version of the assessment will be shredded following entering the data into an online spreadsheet. This consent form will be filed securely in an official area.

Information about your child will be kept confidential to the extent permitted or required by law. People who have access to your information include the Principal Investigator and research study personnel. Representatives of regulatory agencies such as the Office of Human Research Protections (OHRP) and entities such as the Texas A&M University Human Subjects Protection Program may access your child's records to make sure the study is being run correctly and that information is collected properly.

Information about your child and related to this study will be kept confidential to the extent permitted or required by law.

Who may I Contact for More Information?
You may contact the Principal Investigator, John Rayfield, Ed.D, to tell him about a concern or complaint about this research at (979)862-3707 or jrayfield@tamu.edu. You may also contact the Protocol Director, Lindsey Latham at (979)845-7557 or lindsey.latham@agnet.tamu.edu.
For questions about your child's rights as a research participant; or if you have questions, complaints, or concerns about the research, you may call the Texas A&M University Human Subjects Protection Program office at (979) 458-4067 or irb@tamu.edu.

What if I Change My Mind About Participating?
This research is voluntary and you have the choice whether or not to allow your child to be in this research study. Your child may decide to not begin or to stop participating at any time. If they choose not to be in this study or stop being in the study, there will be no penalty. Any new information discovered about the research will be provided to you and your child. This information could affect your willingness to allow your child to continue their participation.

STATEMENT OF CONSENT

The procedures, risks, and benefits of this study have been told to me and I agree to allow my child to be in this study. My questions have been answered. I may ask more questions whenever I want. I do not give up any of my child's or my legal rights by signing this form. A copy of this consent form will be given to me.

_____

Child's Name

_____ _____

Parent/Legal Guardian Signature Date

_____ _____

Parent/Legal Guardian Signature Date

INVESTIGATOR'S AFFIDAVIT:

Either I have or my agent has carefully explained to the parent the nature of the above project. I hereby certify that to the best of my knowledge the person who signed this consent form was informed of the nature, demands, benefits, and risks involved in his/her participation.

_____ _____

Signature of Presenter Date

_____ _____

Printed Name Date

APPENDIX F

CONSENT FORM

Project Title: Influence of FFA Activities on Critical Thinking Skills of FFA Members in Three-Star Chapters

You are invited to take part in a research study being conducted by Lindsey Latham, a researcher from Texas A&M University. **The information in this form is provided to help you decide whether or not to take part. If you decide to take part in the study, you will be asked to sign this consent form. If you decide you do not want to participate, there will be no penalty to you, and you will not lose any benefits you normally would have.**

Why Is This Study Being Done?
The purpose of this study is to determine the influence that FFA activities have on critical thinking skills of FFA members.

Why Am I Being Asked To Be In This Study?
You are being asked to be in this study because you have been randomly selected out of all senior FFA members in three-star FFA chapters in the state of Texas who have been on their chapter's roster for a minimum of two years.

How Many People Will Be Asked To Be In This Study?
A total of 150 people will be invited at 20 study centers.

What Are the Alternatives to being in this study?
The alternative to being in the study is not to participate.

What Will I Be Asked To Do In This Study?
You will be asked to complete the Watson-Glaser Critical Thinking Appraisal as well as a demographic survey. Your participation in this study will last up to one hour only one time and the test will be administered in your school's agricultural science department.

Are There Any Risks To Me?
The things that you will be doing are no greater than risks than you would come across in everyday life.

Will There Be Any Costs To Me?
Aside from your time, there are no costs for taking part in the study.

Will I Be Paid To Be In This Study?
You will not be paid for being in this study.

Will Information From This Study Be Kept Private?
The records of this study will be kept private. No identifiers linking you to this study will be included in any sort of report that might be published. Research records will be stored securely and only John Rayfield, Lori Moore, and Lindsey Latham will have access to the records.

Information about you will be stored in computer files protected with a password. This consent form will be filed securely in an official area.

People who have access to your information include the Principal Investigator and research study personnel. Representatives of regulatory agencies such as the Office of Human Research Protections (OHRP) and entities such as the Texas A&M University Human Subjects Protection Program may access your records to make sure the study is being run correctly and that information is collected properly.

Information about you and related to this study will be kept confidential to the extent permitted or required by law.

Who may I Contact for More Information?
You may contact the Principal Investigator , John Rayfield, Ed.D, to tell him about a concern or complaint about this research at (979)862-3707 or jrayfield@tamu.edu. You may also contact the Protocol Director, Lindsey Latham at (979)845-7557 or lindsey.latham@agnet.tamu.edu.

For questions about your rights as a research participant; or if you have questions, complaints, or concerns about the research, you may call the Texas A&M University Human Subjects Protection Program office at (979) 458-4067 or irb@tamu.edu.

What if I Change My Mind About Participating?
This research is voluntary and you have the choice whether or not to be in this research study. You may decide to not begin or to stop participating at any time. If you choose not to be in this study or stop being in the study, there will be no penalty.

STATEMENT OF CONSENT
I agree to be in this study and know that I am not giving up any legal rights by signing this form. The procedures, risks, and benefits have been explained to me, and my questions have been answered. I know that new information about this research study will be provided to me as it becomes available and that the researcher will tell me if I must be removed from the study. A copy of this entire consent form will be given to me.

_____ _____
Participant's Signature Date

_____ _____

Printed Name Date

INVESTIGATOR'S AFFIDAVIT:

Either I have or my agent has carefully explained to the participant the nature of the above project. I hereby certify that to the best of my knowledge the person who signed this consent form was informed of the nature, demands, benefits, and risks involved in his/her participation.

_____ _____

Signature of Presenter Date

_____ _____

Printed Name Date

APPENDIX G

TEST PROCTOR'S DIRECTION AND SCRIPT

Available Materials:

- Test booklet
- Two soft lead pencils with erasers

Administration Directions

When all examinees have been seated, give each examinee two sharpened soft-lead (No. 2) pencils with erasers. Then distribute the answer sheets. Before distributing the test booklets, make the following announcement:

If you are participating in this study, you have signed and turned in all of the required consent and assent form agreeing to participate in this study. If you did not turn in a signed consent or assent form, you will not be able to participate in this study. If at any time during the test you choose to stop participating, please place your pencil down and turn your assessment into me. After you receive a test booklet, please keep it closed. Do not make any marks on the answer sheet until I tell you to do so.

Next, hold up the answer sheet, and say:

Now turn the answer sheet sideways so that you can fill in the necessary information. DO NOT FILL OUT YOUR NAME. You do need to fill out the date, the name of your school, the city, and the state. (Pause). **Now look at the Name Block to the right.**

You do not need to read the directions to the name block section. Please repeat to the students:

DO NOT FILL OUT THE NAME BLOCK SECTION.

Below the Name Block, mark the Form of the test printed on your test booklet; they should all be A. (Pause). **Mark the appropriate space under Sex.**

Then say:

Now turn your answer sheet so that you can read the words *Watson-Glaser Critical Thinking Appraisal.* (Demonstrate). **In the test all the questions are in the test booklet. There are five separate tests in the booklet, and each one is preceded by its own directions. For each question, decide what you think is the best answer. Since your score will be the number of items you answer correctly, try to answer each question even if you are not sure that your answer is correct.**

Record your choice by making a black mark in the appropriate space on the answer sheet. Always be sure that the answer space has the same number as the question in the booklet. Do not make any other marks on the answer sheet. If you change your mind about an answer, be sure to erase the first mark completely.

Do not spend too much time on any one question. When you finish a page, go right on to the next one.

You will have as much time as you need to work on this test.

Then continue by saying:

Now read the directions on the cover of your test booklet.

After allowing time for the examinees to read the directions, say:

Are there any questions about what you are to do?

Answer any questions, preferably by rereading the appropriate section of the directions. Then say:

Ready?...Begin

If any examinees have routine questions after the testing has started, try to answer them as best you can without disturbing the other examinees. However, questions involving discussions of the subtest directs should be handled by telling the examinee to do his/her best.

At the end of the testing session, collect all test booklets, answer sheets, and pencils, and dismiss the examinees.

Place the competed answer sheets in one pile and the test booklets in another.

APPENDIX H

DEMOGRAPHICS SURVEY

Please indicate which of the following FFA activities you have participated in and at what level. [Select all that apply]

- Officer Position
  - Chapter
  - District
  - Area
  - State
- Leadership Development Events
  - District
  - Area
  - State
  - National
- Career Development Events
  - Area
  - State
  - National
- Conventions
  - District
  - Area
  - State
  - National
- Leadership Camps/Workshops
  - Chapter
  - District
  - Area
  - State
  - National
- FFA Degree
  - Discovery
  - Chapter
  - Greenhand
  - Lone Star
- Speaking Events
  - District
  - Area
  - State
  - National

Please indicate how many years you have been active in FFA.

- 1
- 2
- 3
- 4
- 5 or more

Please indicate your gender.

- Male
- Female